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Smarter Galvanizing through Zinc Coating Optimization with EMG iCASS®: A Modular AI-Driven Platform

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In hot-dip galvanizing processes, achieving optimal zinc coating thickness while minimizing material consumption remains a significant challenge. Traditional control methods often rely on reactive adjustments based on delayed coating thickness measurements, leading to inefficiencies and increased zinc consumption especially at strip transitions with material and coating target changes. To overcome these limitations, EMG iCASS® (intelligent Control and Analytical Software Solutions) provides a modular, AI-powered platform for real-time process optimization in continuous galvanizing lines (CGLs).

By integrating machine learning models, predictive analytics and real-time control mechanisms, EMG iCASS® dynamically optimizes process parameters based on both historical and live production data. The platform allows the implementation of individual modules or a complete control solution.

One of the core outcomes of this approach is the virtual hot measurement module, which enables immediate predictions of zinc layer thickness right after material and coating target changes, reducing the dependency on conventional hot measurement techniques and too late cold measurement results.

Additionally, the safety margin optimization module statically or dynamically adjusts the target zinc thickness to prevent undercoating while minimizing excess consumption, leading to additional material savings.

The complete real-time air knife control module refines the coating process by adjusting pressure or geometric settings based on predictive models, ensuring precise and uniform zinc application. In addition, the nozzle position optimisation module - applicable to CGLs with an existing EMG eMASS® strip stabilization system - eliminates misalignment between the strip and nozzle lips, preventing a wedge-shaped coating profile.

Industrial trials have demonstrated that EMG iCASS® not only enhances process efficiency but may also significantly reduce waste and improve product consistency. By leveraging real-time ML-based predictions, the system ensures a precise and adaptive control mechanism. The platform approach makes it highly flexible and adaptable to various CGL settings, positioning it as a future-proof solution for data-driven process optimization.

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